NEW SPECIES OF *CLITORIA* SUBGENUS *BRACTEARIA* SECTION *CAULIFLORAE* (FABACEAE) FROM NORTHERN SOUTH AMERICA[1]

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Members of *Clitoria* L. subgenus *Bractearia* (Mart. ex Benth.) Fantz section *Cauliflorae* Fantz are typically lianas that bear both cauliflorous inflorescences below the leaves and often axillary inflorescences in the upper leafy portions of the plant. Within the genus *Clitoria* cauliflory is unique to section *Cauliflorae*. Flowers with narrow bracteoles and conspicuous calyx lobes distinguish members of section *Cauliflorae* from lianas belonging to other sections of subgenus *Bractearia*, particularly when a specimen might not exhibit cauliflory. Section *Cauliflorae* comprises the following species (Fantz, 1982): *C. arborescens* R. Brown in Ait., *C. cavalcantei* Fantz, *C. coriacea* Schery, *C. javitensis* (HBK) Benth., *C. leptostachya* Benth., *C. obidensis* Huber, *C. plumosa* Fantz, *C. sagotii* Fantz, *C. selloi* Benth., *C. tunuhiensis* Fantz, and the two species described below. *Clitoria sagotii* was originally described with only a short diagnosis (Fantz, 1979). A more complete description is given here plus descriptions of two new varieties of that species.

1. CLITORIA **kaieteurensis** Fantz, *sp. nov.*

Vites lignosi trahes vel scandes. Folia trifoliata, foliolis ellipticis, oblongo-ellipticis, ovato-ellipticis vel ovatis, obtusis, abrupte breviacuminatis. *Stipulae et stipelae magnopere elongati, 8–19 mm. Inflorescentiae brevissimae 0.5 cm*, axillares et cauliflores, pauciflorae. *Flores magni, 6–7.5 cm. Bracteolae magni*, 9–12 mm longae, *3–5 mm latae. Calyces trichomatibus microuncinatis, tubo 11–17 mm, lobis 7–13 mm.* Stylus elongatus, 23–27 mm, longitudine ovarium magnopere superantes. Legumen stipitatum, planum, trichomatibus microuncinatis praecipue cum macrotrichomatibus dispersis, rufus, fere erectis. *Savannae Kaieteur (Guyanae) endemicae.*

Liana, trailing along ground or climber to 6–10 ft high. *Leaves* 3-foliate, coriaceous, leaflets elliptic, elliptic-oblong, ovate-elliptic, or ovate to occasionally suborbicular, apex obtuse and abruptly acuminate, acumen 2–8 mm long, more or less mucronate, base rotund to weakly cordate, midrib impressed above, primary veins of 8–10 pairs, upper surface dark green, glabrous, lower surface dull green, glaucous, pubescence moderately dense, becoming widely scattered with age, trichomes spreading to sub-erect, lamina

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8–15 cm long, 4–9 cm wide. Petiole reddish-brown, subquadrangular to nearly terete, weakly longitudinally striated, occasionally with a shallow grove adaxially near the apex, 2–7.5 cm, pubescence scattered with uncinate microtrichomes and rufus, subappressed macrotrichomes, becoming glabrate; rachis 1–3 cm, somewhat compressed laterally; petiolules quadrangular, rugose, 5–6 mm. Stipules deciduous, large and conspicuous, lanceolate to oblong-lanceolate, broadly acute, sometimes weakly arcuate, 8–19 mm long, 4–6 mm wide, ciliolate with sparse appressed trichomes on the surface; stipels linear-lanceolate to lanceolate, acute, weakly 5-nerved, 8–13 mm long, 2–3 mm wide, terminal stipels smaller (4–9 mm x 1–2 mm). *Inflorescence* axillary and cauliflorous, 1–4 peduncles per node, dark-colored, subsessile to 0.5 cm long, racemose, few-flowered (1–2, occasionally 3 pairs of flowers), axis pubescence of uncinate microtrichomes with scattered spreading to erect macrotrichomes. Pedicels 4–6 mm with predominately uncinate microtrichomes. Bracts large, 5–8 mm long, 1.5–2 mm wide. Bracteoles large, lanceolate, acute to subacuminate, 9–12 (15) mm long, 3–5 mm wide, inserted 1.5–2 mm below the calyx, pubescence of scattered uncinate microtrichomes. *Flowers* resupinate, large, 6–7.5 cm, pale purple. Calyx pubescence moderately dense, of predominately uncinate microtrichomes with a few, scattered, subappressed macrotrichomes, tube 14–18 cm long, 5–8 mm wide at the base expanding to 9–13 mm wide at the throat, lobes ovate, acuminate, apex rapidly narrowed to triangular acumen one-half the lobe length, 7–11 cm long, 3–5 mm wide at base, ventral lobe 9–13 mm long, 1–1.5 mm wide. Vexillum moderately dense uncinate-pubescent, claw 6–9 mm, blade abruptly curved outward above claw, 3.5–4.5 cm wide. Alae extended well beyond carina by 8–11 mm, blade subfalcate, 17–21 mm long, 7–11 mm wide, claw 19–26 mm. Carina arcuate, 15–18 mm long, 4–5 mm wide, claw 27–33 mm. Stamens diadelphous vexillary stamen coherent near base, tube glabrous, falcate, 39–43 mm long, free filaments 4–6 mm; anthers lanceolate, ca 1.7 mm long, 0.5 mm wide. Gynoecium falcate; gynophore 5–8 mm; ovary 13–17 mm long, 1.2–1.3 mm wide, pubescence white tinged yellowish; style much longer than the ovary, 23–27 mm, bearded, geniculate 2–4 mm from distal end, stigma subcapitate. *Legume* stipitate, base enclosed within calyx lobes, flat, brown, pubescence of uncinate microtrichomes plus scattered, rufus, nearly erect macrotrichomes, valves 8–13 cm long, 10–16 mm wide, beak when persistent, 5–7 mm; dehiscence causing valves to twist one-half to one turn. Seeds brown, smooth, subglobose, face nearly orbicular, slightly compressed, 8–12 mm long, 7–11 mm wide, 4–5 mm thick, 7–9 seeds per pod. Figure 1.

TYPE COLLECTIONS: GUYANA. ESSEQUIBO: locally frequent, scrambler, stems woody, leaves glaucescent beneath, fls. pale purple, cauliflorous, fr. greenish-brown, Kaieteur Savanna, 4 May 1944, *Maguire & Fanshawe 23203* (HOLOTYPE:NY 3107; ISOTYPES: A, F 1280928, K, MO 1371651, U 72863A, US 1950981, VEN 28042).

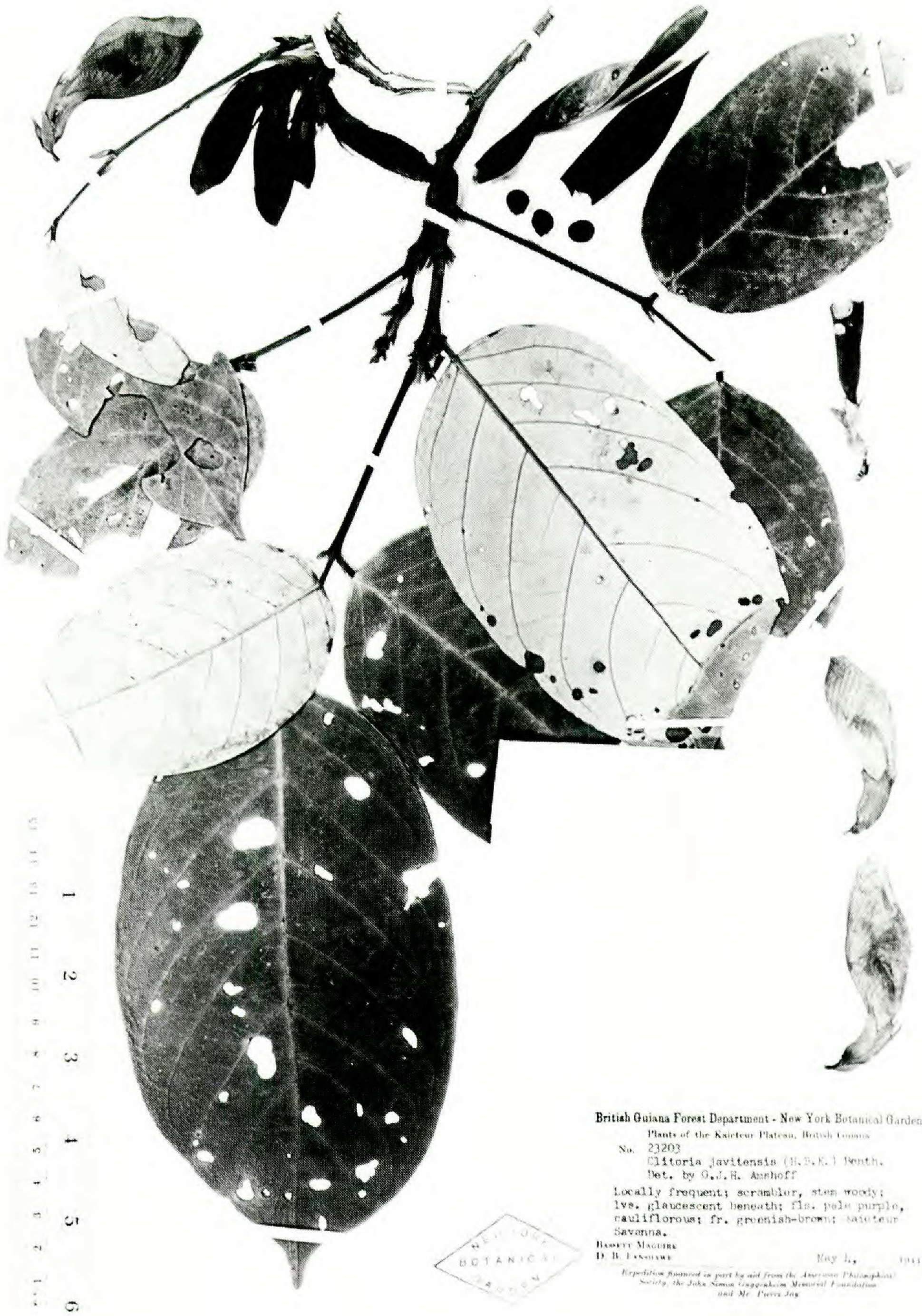

Fig. 1. Holotype of *Clitoria kaieturensis* (*Maguire & Fanshawe 23203*, NY).

The New York specimen is chosen as the holotype because it is the best representative specimen. It includes leaves, an inflorescence with flowers (a dissected flower within the packet) a fruit still attached to its stipe, and some seeds. All known specimens are from the Kaieteur Savanna, the basis for the specific epithet selected.

The specimens of this species traditionally have been identified as *Clitoria javitensis* or as *C. javitensis* var. *glabra* Sagot. *Clitoria kaieteurensis* is distinguished easily from *C. javitensis* by the smaller fruits with uncinate trichomes, uncinate-pubescent calyx, white-pubescent ovary, a style much longer than the ovary, and the subsessile inflorescence. *Clitoria kaieteurensis* exhibits morphological affinities with *Clitoria sagotii* and with other species previously known as *C. javitensis* var. *glabra*, but now excluded from the *C. javitensis* complex (Fantz, 1981). *Clitoria kaieteurensis* is easily distinguished from these species by the large bracts and stipules, and longer staminal tube. *Clitoria sagotti* and related species *C. coriacea* and *C. tunuhiensis* have short stipules (3–6 mm), short bracts (2–5 mm), narrower bracteoles (1–3 mm), and short staminal tubes (32–39 mm).

2. CLITORIA **pendens** Fantz, *sp. nov.*

Vites lignosi ad 30 m. Folia trifoliata, foliolis ellipticis ad ovato-ellipticis, acuminatis. *Inflorescentiae elongatissimae (12–95 cm), pendulae*, cauliflorae, racemoso-nodoso, *multiflorae. Flores magni, 6–8 cm*, albidi suffusi malvinis. *Bracteolae brevissimae, 3–5 mm. Calyces trichomatibus microuncinatis, tuba 17–24 mm faucibus latis.* Stylus elongatus, 27–33 mm, longitudine ovarium magnopere superantes. Legumen brevistipitatum, planum, trichomatibus microuncinatis praecipue cum dispersis macrotrichomatibus subappressis ad patinibus.

Liana, to 30 m long. *Leaves* 3-foliate, thick-membranous to chartaceous, leaflets elliptic to ovate-elliptic, apex obtuse, abruptly acuminate, acumen 1–2 cm long, mucronate, base broadly cuneate to rotund, midrib weakly raised above, primary veins of 6–8 pairs, concolorous, upper surface glabrous, lower surface glabrate (juvenile with stiff erect hairs), lamina 7–15 (27) cm long, 4–7 (10) cm wide, lateral pair of leaflets occasionally asymmetrical. Petioles subquadrangular to terete, 5–9 (11.5) cm, pubescence sparce to glabrous, trichomes uncinate; rachis (1.5) 2–4 (4.5) cm; petiolules subquadrangular, rugose, 5–6 mm. Stipules deciduous, lance-deltoid, acute, inconspicuously striate, 3–4 (5) mm long, 1 mm wide; stipels deciduous, linear, 3–5 mm long, 0.2–0.8 mm wide. *Inflorescence* usually cauliflorous, pendent, racemose, multiflowered, unbranched or rarely forked near the base, highly elongated, generally 12–45 cm long (bearing flowers) to occasionally 95 cm long (with fruit), nodose; primary lateral branches subsessile to 1–2 mm, rarely to 5 mm long; inflorescence fascicled, inserted mainly near the base of the stem (teste *Maguire 54265*) or terminal and bearing small, deciduous leaves along the base of the inflorescence; axis pubescence dense, of uncinate microtrichomes with some appressed, rufus, macrotrichomes,

and becoming sparsely uncinate towards the base. Peduncles 2–10 cm; rachis internodes 2–15 mm. Pedicels 3–5 mm. Bracts minute, lanceolate, acute, 2–3 mm long, 1 mm wide. Bracteoles short, inconspicuous, narrowly lanceolate, acute, 3–5 mm long, 1.1–2 mm wide, inserted 1 mm below the calyx base. *Flowers* resupinate, large, 6–8 cm, whitish becoming pinkish to pale violet with age. Calyx pubescence of predominately uncinate microtrichomes plus few to sparse, appressed, rufus macrotrichomes, tube green with reddish-purple tinge, 17–24 mm long, 5–8 mm wide at base expanding to 9–15 mm wide at the throat, lobes ovate-deltoid, acute, 6–8 (9) mm long, 4–6 mm wide at base. Vexillum uncinate-pubescent to glabrate; blade abruptly curved outward near the base above the claw, 3.5–5 cm wide; claw 10–15 mm. Alae extended 4–6 mm beyond the carina, blade suboblong-spatulate, 23–27 mm long, 7–10 mm wide, claw 23–26 mm long. Carina arcuate, blade 15–20 mm long, 5–7 mm wide, claw 34–36 mm long. Stamens diadelphous, vexillary stamen coherent near the middle and coherent to free near the base, tube glabrous, weakly arcuate, 40–48 mm long; free filaments 2–6 mm; anthers lanceolate, 2–3 mm long, 0.7–0.8 mm wide, connective apiculate. Gynoecium weakly arcuate; gynophore 5–8 mm; ovary 18–20 mm long, 1.5–1.7 mm wide, pubescence dense, white tinged yellowish; style 27–33 mm, much longer than the ovary, bearded, geniculate 8–13 mm from the distal end; stigma capitate, 0.5–0.7 mm diam. *Legume* short-stipitate, base enclosed by calyx lobes to slightly exerted, flat, pubescence of uncinate microtrichomes with scattered subappressed to spreading macrotrichomes; with scattered subappressed to spreading macrotrichomes; valves 13.5–16 cm long, 10–15 mm wide; stipe 23–31 mm long; beak 4–8 mm; dehiscence not observed. Seeds not observed, ca 7–8 per pod. Figure 2.

TYPE COLLECTION: SURINAM. NICKERIE: Liana, cauliflorous, flowers mainly at base, calyx green and reddish, corolla, lavender, wood yellow, in mesophytic forest, 9 km north Lucie River, 12 km west Oost River, 3°36′ to 3°41′N–56°30′ to 56°34′W, 275 m, 16 Jul 1963, *Maguire et al. 54265* (HOLOTYPE: NY). SURINAM. NICKERIE: hills 9 km N of Lucie River, 12 km W of Oost River, 275 m, 1 Aug 1963, *Irwin et al. 54552* (PARATYPES: F 1615263, GH, MO 1800897, NY, S, U 169942B, US 2447103).

The specimen selected as the holotype is the only specimen examined that has both flowers and fruits. However, this specimen does lack the vegetative structures. A second collection from the same locality, *Irwin et al. 54552*, is selected as a paratype. It has both vegetative and floral structures, some of which are in a dissected state. Both type collections exhibited the characteristic elongated inflorescences. This is the only species in the genus reported to have pendulous inflorescences, hence the specific epithet.

This species has close morphological affinities with *C. leptostachya*. Historically, any liana specimen with very elongated inflorescences and lacking the large bracteoles which hide the calyx was identified as *C. leptostachya*. *Clitoria leptostachya* can be distinguished easily from *C. pendens* by the

Fig. 2. Holotype of *Clitoria pendens* (*Maguire et al. 54265*, NY).

smaller flowers (4–6 cm), narrower calyx tube (7–10 mm wide at the throat), shorter calyx lobes (4–6 mm), longer pedicels (5–7 mm), smaller wings & keel, shorter staminal column (32–37 mm), and shorter style (17–19 mm) which is only slightly longer than the ovary (12–15 mm).

3. CLITORIA SAGOTII Fantz, SIDA 8(1): 94. 1979.

Clitoria javitensis (HBK) Benth. var. *glabra* Sagot, Ann. Sc. Nat. Ser. 6, 13: 299. 1882. (TYPE: *Sagot 120*, K).

Clitoria javitensis (HBK) Benth. var. guianensis Sagot, *nom. in sched.* (TYPE: *Sagot 120*, GH, NY, U, W).

Clitoria prostrata Spruce, *nom. in sched.* (TYPE: *Spruce 3543*, K).

Liana, climbing or occasionally trailing. *Leaves* 3-foliate, coriaceous, concolorous (green), leaflets elliptic-oblong or elliptic to lanceolate, narrow to very broad, apex obtuse abruptly acuminate, acumen 1–2 cm, base cuneate to broadly cuneate, midrib conspicuously raised above, primary veins of 6–11 pairs, both surfaces glabrous, lamina (6.5) 8–21 (25) cm long, 3–8 (13) cm wide. Petiole subquadrangular-terete, adaxially truncate to canaliculate, 1.5–8.5 cm, glabrate to uncinate microtrichomed; rachis 1.5–4 cm; petiolules quadrangular, dark-colored, rugose, 4–9 mm. Stipules deciduous, deltoid-lanceolate, acute, 4–5 (6) mm long, 1.5–2 mm wide; stipels somewhat persistent, linear to lanceolate, acute, 1–6 mm long, 1–1.5 mm wide. *Inflorescence* axillary, solitary, or cauliflorous, fascicled, racemose, few-flowered (2–4 flowers, rarely 6), subsessile to 0.5 cm long; axis pubescence of uncinate microtrichomes. Pedicels 6–11 mm, with uncinate microtrichomes; pedicels of cauliflorous inflorescences compressed, flattened below the bracteoles and 2–3 mm wide. Bracts ovate, obtuse, with uncinate microtrichomes and ciliolate, 3–5 mm long, 1–2 mm wide. Bracteoles linear-lanceolate, acute to short-acuminate, often spreading, 4–11 mm long, 1–2 mm wide, inserted 2–5 mm below the calyx base. *Flowers* resupinate, large, 5–8 cm, vexillum pinkish-mauve with darker-colored veins near the center, alae and carina white. Calyx chartaceous, conspicuously uncinate microtrichomes and scattered subappressed to spreading macrotrichomes, tube 11–16 mm long, 4–7 mm wide at base expanding to 8–13 mm wide at the throat, lobes deltoid-ovate to lanceolate, acuminate, more or less arcuate, 5–13 mm long, 2–6 mm wide at base. Vexillum pubescence of uncinate microtrichomes with scattered appressed macrotrichomes, blade 3–4.5 cm wide, claw 6–9 mm. Alae extended well beyond carina by 8–13 mm, blade spatulate-falcate, 18–23 mm long, 8–12 mm wide, claw 17–26 mm. Carina nearly straight, uncinate microtrichomed, blade 11–18 mm long, 3–6 mm wide, claw 25–35 mm. Stamens diadelphous, vexillary stamen coherent at the base, tube glabrous, arcuate-falcate, 32–39 mm long, free filaments 4–7 mm, anthers lanceolate, 1.5–2.1 mm long, 0.7–0.8 mm wide, connective acute, nearly subequal to anther sacs. Gynophore 2–4 mm; ovary 10–15 mm long, 1–1.3 mm wide, pubescence white tinged yellowish; style 22–26 mm,

dark-colored, much longer than the ovary, bearded, geniculate 8–10 mm from the distal end; stigma capitate, 0.6–0.8 mm diam. *Legume* (known from var. *canaliculata* only) stipitate, exerted above the calyx, flat, pubescence moderate, more commonly borne along the sutures, of uncinate microtrichomes with few, scattered, suberect macrotrichomes; valves 8.5–15 cm long, 15–18 mm wide; stipe straight to weakly arcuate, 27–35 mm long; beak 10–15 mm when persistent; dehiscence causing valves to twist 1–2 turns. Seeds (observed in damaged condition) dark brown to black, smooth, thick, lenticular to subglobular, 6–7 mm long, 6–8 mm wide, 4–5 mm thick, 4–8 seeds per pod. Figure 3.

TYPE COLLECTIONS. FRENCH GUIANA. Frutex alte scandens, flores rosei, suavolentes, plurimi e ligno prodientes, fructum non vidi, Karouany, 1857, *Sagot 120* (HOLOTYPE: K-Hb. Bentham, photo at S; ISOTYPES:GH, NY, S, U, 37632A, W).

This species includes a number of specimens that typically go by the name of *C. javitensis* var. *glabra* Sagot. This group of plants has been excluded (Fantz, 1981) from the broad concept of *C. javitensis* as observed by Bentham (1858), Sagot (1882), and later authors who adopted Sagot's treatment. *Clitoria sagotii* can be distinguished easily from *C. javitensis* by the prominent uncinate microtrichomes on the calyx, legume, and various plant axes, the raised midrib on the upper leaf surface, the subsessile inflorescences, short vexillum claw, and smaller fruits. For a more detailed discussion, refer to Frantz (1981).

This species consists of three distinct varieties, nearly allopatric in distribution.

3a. CLITORIA SAGOTII var. SAGOTII

Clitoria javitensis (HBK) Benth. var. *glabra* Sagot, Ann. Sc. Nat. Ser. 6, 13: 299. 1882. (TYPE: *Sagot 120* K).
Clitoria javitensis (HBK) Benth. var. *guianensis* Sagot, *nom. in sched.* (TYPE: *Sagot 120*, GH, NY, U, W).

Leaflets (12) 15–21 (25) cm long, 5–8 (13) cm wide, primary veins of 8–11 pairs. Petiole 5–8.5 cm long, flattened (truncate) adaxially, without grooves. Flowers large, 6–8 cm. Calyx lobes elongate, 8–13 mm. Bracteole 6-10 mm. Ovary elongate, 13–15 mm.

The typical variety is recognized easily by the larger flowers with elongated calyx lobes and more robust vegetative features. It is known from mountain forests of French Guiana, blooming between December through February.

3b. CLITORIA SAGOTII var. **canaliculata** Fantz, *var. nov.*

Clitoria sagotii Fantz var. *caniculata* Fantz, *nom. in sched.* (err. orthog.)
Varietate novo *Clitoria sagotii* distinguibus ab petiolo canaliculato adaxiali conspicue et bracteolatis brevioribus insertibus base calyci 2–4 mm.

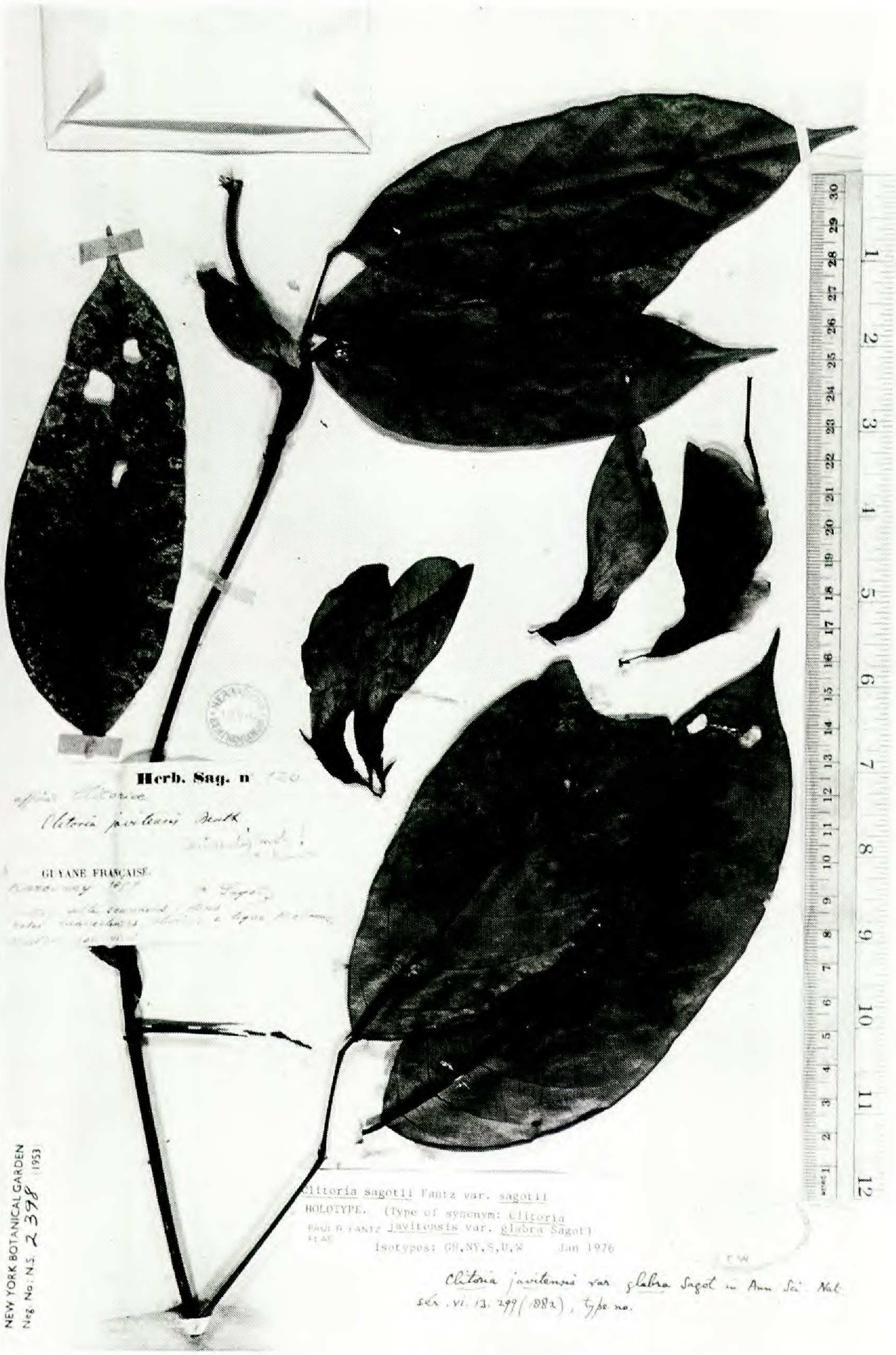

Fig. 3. Holotype of *Clitoria sagotii* (*Sagot 120*, K-Hb. Bentham).

Leaflets (6.5) 8–16 (20) cm long, 2.5) 3–7 cm wide, primary veins of 6–8 pairs. Petiole 1.5–5.5 (7) cm, with a conspicuous shallow to deep longitudinal groove adaxially. Petiolules 4–6 (rarely 7–9) mm. Flowers 5–6.5 (8) cm. Calyx lobes 5–8 mm. Bracteoles 4–6 mm. Ovary 10–22 mm.

TYPE COLLECTION. GUYANA. Vine with woody stems either procumbent in the open or twining up low bushes in secondary wh. sand forest, sandhills, Demerara River, 22 Feb 1943, field no. F 1197, *Forest Dept. British Guyana 3933* (HOLOTYPE: K-sheet labeled no. 2!; ISOTYPES: K-sheet labeled no. 1 not seen, NY!).

This variety is recognized easily by the canaliculate petioles. It is found in sandy soils of savannas and upland woods and thickets in Guyana, Surinam, and rarely in eastern Venezuela. Flowers have been collected from July through March. Fruits have been collected from November through February, with one collection in July.

3c. CLITORIA SAGOTII var. **sprucei** Fantz, *var. nov.*

Clitoria prostrata Spruce, *nom. in. sched.* (TYPE: *Spruce 3543*, K).

Varietate novo *Clitoria sagotii* ad regio occidentali Amazoniacum distinguibus ab floribus parvitibus cum lobibus calyci brevioribus et petiolo acanaliculato.

Leaflets 7–18 cm long, 3–7 cm wide, primary veins of 8–11 pairs. Petiole 2–7 cm long, flattened (truncate) adaxially, without grooves. Petiolules 7–8 mm. Flowers 5–6.5 cm. Calyx lobes 5–8 mm. Bracteoles (6) 7–10 mm long, subtending and inserted 1 (2) mm below calyx base. Ovary 10–12 mm.

TYPE COLLECTIONS: VENEZUELA [?]. AMAZONAS: AC. Tomo fl. Guaimie, ubi in graminosis sylvanum humiliorum gregarie viget, 18 Aug 1854, *Spruce 3543* (HOLOTYPE; K-Hb. Bentham). VENEZUELA: Ad flum. Guainiá v. Rió Negro supra ostium fluv. Casiquairi, 1854, *Spruce 3543* (PARATYPES: G 195 & 196, GH, CGE-Hb. Lindley, F 1546829, W 112030, RB 17245). BRAZIL. AMAZONAS: prope San Carlos, ad Rió Negro Brasilia borealis, 1853-4, *Spruce 3543* (PARATYPES: BM, K-Hb. Bentham, W 18666).

Spruce 3543 includes three sets of data, yet all plants were collected within a small geographic area and recognized by Spruce as one species. The holotype selected is the only one bearing Spruce's manuscript name of *Clitoria prostrata*, the probable original collection of the three sets placed under one number by Spruce.

This variety lacks the conspicuous canaliculate petioles of var. *canaliculata* and bears smaller flowers and calyx lobes, distinguishing it from var. *sagotii*. The species is widely distributed in woods or open areas in the western Amazon basin, in western Brazil, southern Venezuela, and rarely in southern Colombia. Flowers have been collected in August, November, and April through June.

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